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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/681,497	10/08/2003	Stephen G. Bales	LA 001	5906

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EXAMINER	
DANIELS, MATTHEW J	
ART UNIT	PAPER NUMBER
1791	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/681,497	BALES, STEPHEN G.	
	Examiner	Art Unit	
	MATTHEW J. DANIELS	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 June 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-6,8-10,12,14,16 and 18-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-6,8-10,12,14,16 and 18-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *6/30/09*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Correction of the number of Claim 5 is requested.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. **Claims 19 and 20** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification does not appear to provide support for the ranges now recited by these new claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. In view of the multiple species claimed (zinc borate, boric acid, colemanite, different polymeric materials) and the differing scope of Claims 1 and 16, multiple rejections were required.

4. **Claims 1, 3-5, 6, 8, 9, 11, 12, and 15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Touval (USPN 3926883) in view of Pelikan (USPN 4104207). **As to Claim 1**, Touval teaches forming a polyolefin (2:11) thermoplastic product which comprises incorporating an amount of boron containing material which inherently acts as a fungicide in an amount between 2-12% of the article (7:30-60). Touval appears to be silent to the lignocellulosic material and the particular claimed amount of polyolefin, however, such composites are conventional and well known to those skilled in the art. See Pelikan (Abstract, lines 1-3, 6:19, 6:39-53). In particular, Pelikan suggests that the proportion of the vegetable filler material (6:4, 6:44) in the polyolefin (6:19) can be 5 wt.% to 25 wt.% of the weight of the thermoplastic material (6:29-30) and that the mineral filler may be up to 50 wt.%. Since the maximum amount of fillers is therefore 75 wt. % (vegetable + mineral filler), it is submitted that Pelikan teaches at least 50 wt.% (and up to 90 wt.%) thermoplastic.

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Pelikan, the method comprising incorporation of lignocellulosic filler, into that of Touval because (1) doing so would provide reinforcement (increased strength) and a foaming agent (decreased weight), and because this technique (lignocellulose as a reinforcement or carrier for blowing agent), is a conventional technique in the art that one would have found it obvious to apply to the Touval method, and (2) Touval

suggests foams (Example 5), and Pelikan provides the ability to foam by using the lignocellulose reinforcement as a carrier for a foaming agent.

As to Claims 3-6, 8, 9-11, 12, and 15, Touval teaches polyethylene (2:10-11) which is a thermoplastic, and colemanite (Table 1, column 7, colemanite is a naturally occurring calcium borate) used in an amount of 3-5% (Table 1, samples 7-8), which would inherently provide the claimed degree of resistance to visual impairment. Additionally, the amount of colemanite is clearly a result effective variable that one would optimize to arrive at the claimed range which is not substantially different than the amounts disclosed by Touval in Col. 7. Pelikan clearly suggests pine wood as a lignocellulosic material (6:66).

5. **Claims 1, 3-6, 8-12, 15, and 18** are rejected under 35 U.S.C. 103(a) as being unpatentable over Pelikan (USPN 4104207) in view of Lloyd (USPN 6368529). **As to Claim 1**, Pelikan teaches a method for forming composite products which incorporate a polyolefin thermoplastic (7:19-20) material, a lignocellulosic material (7:21-22 and Abstract, line 3), and a blowing agent (7:23-24, bubbles). Claim 1 of the Pelikan suggests that it would have been obvious to provide a composite consisting of only these components. With respect to the claimed amount of the polyolefin, Pelikan suggests that the proportion of the vegetable filler material (6:4, 6:44) in the polyolefin (6:19) can be 5 wt.% to 25 wt.% of the weight of the thermoplastic material (6:29-30) and that the mineral filler may be up to 50 wt.%. Since the maximum amount of fillers is therefore 75 wt. %, it is submitted that Pelikan teaches at least 50 wt.% (and up to 90 wt.%) thermoplastic.

Although silent to the borate materials, Lloyd teaches the claimed amount (4%) of calcium borate in the form of colemanite incorporated into a composite material (3:45-62).

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Lloyd into that of Pelikan because (1) Pelikan provides a material which includes wood or other lignocellulosic materials and Lloyd teaches that calcium borate may be used as a pesticide against fungi and insects that destroy wood, thus it would have been obvious to apply the improvement of Lloyd to the material of Pelikan, with the expected result that the same fungi and insect resistance would be provided to the Pelikan material, and/or (2) the calcium borate of Lloyd would act as a flame retardant (cols. 7 and 8), and Pelikan specifically suggests a flame retardant (4:28-31).

As to Claims 3-6, 8-10 and 12, Lloyd teaches the claimed amount (3:45-62) of naturally occurring colemanite (calcium borate), and Pelikan clearly suggests pine wood as a lignocellulosic material (6:66) and suggests polyethylene (6:5) as one matrix material. **As to Claim 18**, Pelikan teaches a method for forming composite products which incorporate a polyolefin (6:5) thermoplastic (7:19-20) material, a lignocellulosic material (7:21-22 and Abstract, line 3), a color additive (6:27-28), and softeners or stabilizers (6:22) which may be considered to be coupling agents since they would help the polymer conform and bond to the lignocellulose, and a lubricant (water, 6:48). With respect to the claimed amount of the polyolefin, Pelikan suggests that the proportion of the vegetable filler material (6:4, 6:44) in the polyolefin (6:19) can be 5 wt.% to 25 wt.% of the weight of the thermoplastic material (6:29-30) and that the mineral filler may be up to 50 wt.%. Since the maximum amount of fillers is

therefore 75 wt. %, it is submitted that Pelikan teaches at least 50 wt.% (and up to 90 wt.%) thermoplastic.

Pelikan is silent to (a) the high density polyethylene and (b) the borate materials. However, these aspects of the invention would have been obvious for the following reasons:

(a) The Examiner's position is that Pelikan expressly suggests a genus of polyethylene materials ("all thermoplastics and related plastics may be used….e.g. polyvinyl chloride, polyolefins, polyethylene...", Pelikan, 6:3-5), and that the genus of polyethylene materials is sufficiently small that the ordinary artisan would have immediately envisioned the claimed high density polyethylene (HDPE). Alternatively, one of ordinary skill in the art at the time of the invention would have found it obvious to use an HDPE in place of the polyethylene suggested by Pelikan since it would have been a recognized and obvious substitute in the art.

(b) Lloyd teaches the claimed amount (4%) of calcium borate in the form of colemanite incorporated into a composite material (3:45-62).

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Lloyd into that of Pelikan because (1) Pelikan provides a material which includes wood or other lignocellulosic materials and Lloyd teaches that calcium borate may be used as a pesticide against fungi and insects that destroy wood, thus it would have been obvious to apply the improvement of Lloyd to the material of Pelikan, with the expected result that the same fungi and insect resistance would be provided to the Pelikan material, and/or (2) the calcium borate of Lloyd would act as a flame retardant (cols. 7 and 8), and Pelikan specifically suggests a flame retardant (4:28-31).

6. **Claims 1, 3-5, and 14** are rejected under 35 U.S.C. 103(a) as being unpatentable over Pelikan (USPN 4104207) in view of Borogard ZB (of record, 3/20/08 IDS). While it is noted that the IDS appears to cite the Borogard ZB sheet as having been published July 26, 2003, the document states on its face that it was "Accepted" on July 26, 1993. The 2003 citation in the IDS is believed to be a typographical error. **As to Claim 1**, Pelikan teaches a method for forming composite products which incorporate a thermoplastic (7:19-20) material, a lignocellulosic material (7:21-22 and Abstract, line 3), and a blowing agent (7:23-24, bubbles). Claim 1 of the Pelikan suggests that it would have been obvious to provide a composite consisting of only these components. With respect to the claimed amount of the polyolefin, Pelikan suggests that the proportion of the vegetable filler material (6:4, 6:44) in the polyolefin (6:19) can be 5 wt.% to 25 wt.% of the weight of the thermoplastic material (6:29-30) and that the mineral filler may be up to 50 wt.%. Since the maximum amount of fillers is therefore 75 wt. %, it is submitted that Pelikan teaches at least 50 wt.% (and up to 90 wt.%) thermoplastic.

Although silent to the zinc borate, Borogard ZB teaches incorporation of zinc borate at a loading of 3-20 parts or 0.5 to 8% for use as a biocide and fire retardant (phrase below title, also Plastic and Rubber Products and Wood Composite Materials section on Page 2 of 3). This quantity reads on the claimed amount of zinc borate.

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Borogard ZB into that of Pelikan because (1) Pelikan provides a PVC material incorporating wood, and Borogard ZB expressly suggests the zinc borate for use with PVC, plastics, and wood composite materials, and/or (2) the calcium borate

of Borogard ZB would act as a flame retardant (cols. 7 and 8), and Pelikan specifically suggests a flame retardant (4:28-31).

As to Claims 3 and 14, Borogard ZB teaches zinc borate and suggests that it be incorporated into plastics and wood composites in the claimed amount (Page 2 of 3). **As to Claims 4, 5 (or second Claim #3), and 10**, Pelikan clearly suggests pine wood as a lignocellulosic material (6:66) and polyethylene as a thermoplastic (6:19).

7. **Claim 16** is rejected under 35 U.S.C. 103(a) as being unpatentable over Wold (US 5,435,954) in view of Lloyd (USPN 6368529). **As to Claim 16**, Wold teaches a material that consists of plastic (HDPE), wood flakes, and a coupler in volume fractions of 60% wood flakes, 37% HDPE, and 3% coupler (13:7-15). It is submitted that conversion to weight percent suggests the claimed polyolefin material amount. In the alternative, one would have found it obvious to optimize the amount of plastic in the Wold composite through routine experimentation since the provides the recognized result that it acts as the binder for the wood material. Wold is silent to the calcium borate and its amount.

However, Lloyd teaches the claimed amount (4%) of calcium borate in the form of colemanite incorporated into a composite material (3:45-62).

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Lloyd into that of Wold because (1) Wold provides a material which includes wood or other lignocellulosic materials and Lloyd teaches that calcium borate may be used as a pesticide against fungi and insects that destroy wood, thus it would have

been obvious to apply the improvement of Lloyd to the material of Wold, with the expected result that the same fungi and insect resistance would be provided to the Wold material.

Response to Arguments

8. Applicant's arguments filed 30 June 2009 have been fully considered. The arguments are persuasive with respect to certain rejections. The arguments appear to be on the following grounds:

(a) (pages 3-4) Naturally occurring calcium borates are poor flame retardants. Kuckro teaches that Colemanite must be used in a minimum of 2:1 polymer to Colemanite to achieve adequate flame resistance. Pitts and Panusch provide similar evidence that one or ordinary skill in the art seeking to impart flame retardancy to a material using Colemanite would be motivated to use only high loadings above the claimed range.

(b) (page 4) The art teaches that a minimum borate loading is 7.1% for adequate fire retardancy.

(c) (Pages 5-6) At the time of the invention, most wood plastic composite experts believed there was no need to protect wood composites from decay. Verhey demonstrates that the inherent high biodegradation resistance of the plastic matrix is sufficient to provide resistance to fungal degradation without preservatives. The instant specification also identifies that zinc borate of 1.5% was used in lignocellulosic composites, whereas Verhey identified 1% zinc borate as sufficient to protect wood from decay.

(d) (pages 6-7) If a flame retardant result is required, the lowest possible loading using zinc borate would be in excess of 7%, which is well in excess of the 5% of claim 3. None of the prior

art suggests a desired result of mold resistance. Loading a composite with 5% of zinc borate or colemanite would leave the material without adequate fire retardant characteristics.

(e) (pages 7-8) Touval requires stannic oxide in the very specific ratio of 1:4 for a flame retardant material. Touval identifies the ranges for fire retardants as 0.5 to 10 phr applicable to polyvinyl chloride while the 4-25 phr is for polymers such as polyethylene. Applicant remains of the view that Touval teaches more than 16% colemanite to provide flame retardancy to a polyethylene composite.

(f) Pelikan allows a maximum lignocelluloseic content of 23% of the total composite weight. However, the reference to vegetable material relied upon by the office action refers to the fillers. The vegetable material, which includes the carrier and gas bubble forming material, is only 5-25%. Additionally, Claims 16, 18, and 20 do not include a gas forming medium such as that required by Pelikan.

(g) The arguments above (pages 3-4) describe why one would not consider substituting colemanite for zinc borate as a fire retardant.

(h) The arguments with regard to Aida also apply to Wold.

9. Response:

(a) The Examiner has reconsidered and withdrawn this rejection, although the Aida process is still believed to be pertinent for its teaching of particular amounts of wood, plastic, and zinc borate.

(b) The Examiner respectfully disagrees. Borogard ZB clearly teaches the ordinary artisan how to use zinc borate in low quantities either as a biocide or fire retardant.

(c) Even if Verhey identified a threshold where zinc borate became effective, it is submitted that the ordinary artisan would have recognized that providing more than the threshold amount as an obvious means for ensuring resistance to attack. The Examiner is not persuaded that levels above the known threshold represent a nonobvious improvement.

(d) While flame retardancy is one consideration, Borogard ZB teaches a preferred range which overlaps with the claimed range.

(e) Even accepting Applicant's argument that the 4-25% applies to polyethylene, where the 1:4 ratio of stannic oxide:colemanite ratio applies, Touval still suggests colemanite values within the claimed range.

(f) Note that the instant claims define the invention with respect to the amount of polyolefin in a composite - the claim does not recite any particular amount of lignocellulosic material, but instead only requires that the amount of polymer be 25-75%. Since Pelikan teaches, at most, 25% carrier+ blowing agent (6:14) and 50% filler (6:30), it is submitted that the remainder (25%) is plastic which may be a polyolefin, which meets the claimed amount of polyolefin.

(g) The Borogard ZB reference suggests particular amounts of zinc borate for use in composites, and it is submitted that using the suggested amounts in the Pelikan process would lead to the claimed process.

(h) The Examiner submits that the Wold reference is pertinent, and that the arguments against the Aida reference to do not apply to Wold.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW J. DANIELS whose telephone number is (571)272-2450. The examiner can normally be reached on Monday - Friday, 8:00 am - 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on (571) 272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew J. Daniels/
Primary Examiner, Art Unit 1791
9/12/09